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at least, new figures representing the old object (Ex. Figs. 4, 6, 116, 118, 140).

There is a small number of the inevitable verbal errors, of which may be noted : *foramen lacerus anterior* (p. 164), Fascia used as a plural (p. 112), and Malapterus (p. 115).

A New Text-Book on the Nervous System. — No field of zoölogical research has been more assiduously cultivated or has yielded more important results in the last decade than the nervous system. While the cell theory and the interpretation of most tissues in conformity with it are matters of history, the conception of the nervous system as an association of cells dates really from 1891. With the enunciation of the neurone theory by Waldeyer in that year, a new era in the study of the nervous system began ; and though this theory may require modification even in some fundamental respects, it has been undoubtedly a most important factor in bringing order into what was neurological chaos. The result of this clarifying influence has been, not only an enormous productivity in effective research, but the appearance of several high-grade text-books dealing with the nervous system from the new standpoint. Ramon y Cajal's well-known brochure heads the list as the first consistent attempt to describe the nervous system of the higher animals as an aggregate of neurones. The same principle was adopted in van Gehuchten's text-book, and to a less extent in the more conservative treatises by Edinger and by von Lenhossék, and is accepted by the well-known American neurologist, L. F. Barker, in his new text-book entitled *The Nervous System and its Constituent Neurones.*[1]

The book, though divided into six sections, which are further subdivided into chapters, falls naturally into two parts : the first, comprising the first five sections of a little over 300 pages, contains a general account of the structure and physiology of the nervous unit or neurone ; and the second, including only the sixth section of some 650 pages, presents a descriptive account of the groups of neurones constituting the nervous system of man and other higher mammals.

To the general reader the first five sections are naturally the more interesting. The first section is given to an historical account of the development of the neurone concept. This opens with a description of the diffuse nervous network, supposed by Gerlach to be the means of communication between the nervous elements, and is followed by an account of the discoveries made chiefly by the Golgi and the Ehrlich methods, whereby investigators were led to abandon Gerlach's views. By this course the reader is led up to the full statement of the neurone theory by Waldeyer in 1891. The concluding chapter of this section deals with the objections which have been raised to the theory since its promulgation. The foundations of the theory are fourfold: first, it is *a priori* probable that the nervous system, like other parts of the body, is a cellular system; secondly, it is well established that the embryonic nerve cells are as distinct from one another in the beginning as any other cells; thirdly, the nutrition of the nervous elements, as shown in their degeneration, etc., is most readily understood on the grounds of this theory; and, fourthly, the selective staining of elements as seen in Golgi and in Ehrlich preparations accords well with this view. The objections raised against the theory are regarded by the author as relatively slight. The union of nerve cells through their processes, as seen occasionally by observers such as Dogiel, is regarded as no more objection to the general theory than Siamese twins are to the idea that the human species is made up of separate individuals. The results of Apáthy's studies, according to which a network much as Gerlach believed in is claimed to exist, are stamped with "Not proved"; and the author states that even should they prove true they afford no grounds for a serious criticism of the theory.

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[1] Barker, L. F. *The Nervous System and its Constituent Neurones*, designed for the Use of Practitioners of Medicine and of Students of Medicine and Psychology. New York, Appleton & Co. xxxii + 1122 pp., 676 illustrations, and 2 colored plates.

The second section deals with the external morphology of the neurone. The classification of cell processes into axones and dendrites is generally accepted, and only a hint is now and then given that the conditions in the lower animals show that this distinction is one of a very questionable nature and certainly not fundamental. The interrelation of neurones through contact only and the so-called "retraction theory," so much in vogue with certain classes of psychologists, are put in their true light as a matter of great uncertainty.

The third section, on the internal morphology of the neurone, is a masterful presentation of one of the most confused and intricate problems of neurology. The interpretation of conflicting results on the basis of differences in methods and the sweeping away of difficulties arising from a confusion in terminology are admirable features of this part of the work. In one respect only is the author less happy in his treatment of the subject. He expresses the belief that many of the problems of the finer anatomy of nerve cells must wait for solution till more definite knowledge can be gained of the structure of cells in general. To us it seems that the nerve cell is one of the best cells in which these problems can be attacked.

The section on the histogenesis of nerve tissue is less satisfactory than any of the preceding, because too little is given on histogenesis and too much on the topographical development of the vertebrate nervous system. The subject of the development of nerve fibres is only touched, and the differentiation of the various forms of nerve cells receives little attention. A very full account of the segmental arrangement of the spinal nerves and their relation to the musculature is given.

The physiological and pathological aspect of the neurone is treated in the fifth section. The metabolism of the nerve cell, as illustrated by the degeneration of its fibres when cut from it, is well described, and emphasis is justly laid on the lately discovered changes shown in cells from which fibres have been separated. The equally important subject of the regeneration of nerves is passed over with very few words. Reasons are brought forward to show that neurones in life are under slight but continuous stimulation, and that all parts of the neurone, including the dendrites, are more or less concerned with true nervous functions. The nature of nervous impulses is not discussed, but their directions so far as the cell body is concerned are shown to be not subject to such simple laws as have been formulated. This section concludes with an excellent résumé of the visible effects of fatigue and poisons on nerve cells, and a brief consideration of the means by which the cell body influences the nutrition of the distant parts of its fibres.

The sixth section includes an exhaustive account of the groups of neurones making up the human nervous system. Its five subsections deal with the following groups: sensory neurones of the first order; sensory neurones of the second order; lower motor neurones; upper motor neurones; and projection, commissural, and association neurones.

While every student of neurology will be thankful to the author for the thoroughgoing way in which he has carried out his undertaking, and for the admirable clearness with which he has set down his results, the work is not without its faults. Chief among these is the very general absence of reference in the more introductory sections to the results of neurological study in the lower animals. While the comparative novelty of this field may be some excuse for its neglect, the part it has played in setting in a right light many of the general problems which have arisen in the neurology of higher forms shows that one cannot afford to neglect it.

A second and perhaps less pardonable fault is the absolutely unqualified way in which the neurone theory is accepted and the light manner in which really serious objections to it are passed over. To read the author's presentation of Apáthy's work one would think that this investigator's results were almost in line with the neurone doctrine; but an unbiased comparison shows this not to be true. Surely the statements of Apáthy, if correct, are more serious obstacles to the acceptance of the neurone theory than Barker is willing to admit; and what is perhaps less consoling to an advocate of the theory is that these statements have received no small amount of confirmation at the hands of Bethe.

The letterpress and numerous illustrations are excellent, and the volume is provided with two indices — one for subjects and the other for authors. In the subject index the two kinds of type used in the page numbers refer, we are told, in one case to text and in the other to figure reference; in the author's index two kinds of type are also employed, but, probably through an oversight, no explanation of their use is given.

The defects which the book has are few compared with its excellencies, and we do not hesitate to pronounce it a masterly production of the highest quality of which Americans may justly be proud.

G. H. P.

Neurone Theory. — A very interesting and timely brochure on the neurone doctrine and its opponent has come from the pen of A. Hoche.[1] The author gives a clear statement of the foundations of the theory, and then considers it in the critical light of recent discovery. His conclusions are that the neurone theory in its original form is no longer tenable, and that the fibrillar theory must replace it, so far as the histology of the adult nervous elements is concerned. The nervous elements develop as independent cells, and become secondarily connected by fibrillar growths, though in this later condition they reassert their physiological independence in the various aspects of their metabolism. The histogenesis and physiology of nervous elements, particularly their trophic relations, follow then on the lines laid down by the neurone theory, and in these respects this theory may still be said to be valid.

G. H. P.

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[1] Hoche, A. Die Neuronenlehre und ihre Gegner. 51 pp. A. Hirschwald, Berlin, 1899.